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ALIMENTARY HYPOKINESIA

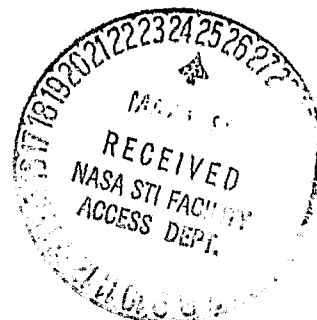
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## ALIMENTARY HYPOKINESIA

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The complex of disturbances in the area of alimentation and digestion that develop due to hypokinesia may be referred to as alimentary hypokinesia and this may be regarded as a special form of the phenomenon of general hypokinesia. /18\*

Alimentary hypokinesia is based upon weakening of the activity of the digestive system combined with a reduction in alimentation activity against a background of developing endogenic intoxication. Under the influence of prolonged hypokinesia there is a weakening of the activity of the secretory and motor function of the stomach and intestine leading to tonus reduction in the entire digestive system. Moreover, due to hypokinesia there occur adverse shifts in the makeup of the intestinal microflora that intensify putrefactive processes as well as redistribution of the microflora in various portions of the digestive tract. These changes in the microbic landscape make an impression on all aspects of the digestive processes. It is not out of the question, that in the case of a mature and older person the greatest harm to health from hypokinesia proceeds from its untoward effect on the composition of the intestinal microorganisms and the shifts arising therefrom. The intensification of putrefactive processes in the intestine, on the one hand, and failure, on the other hand, to eliminate its contents due to a reduction in motor activity produces increased absorption of the toxic products of decomposition.

The attendant chronic endogenous intoxication has an adverse effect on the condition and function of the liver and on its digestive, detoxifying and synthesizing functions and this in turn aggravates and intensifies the development of endogenous intoxication. /19

The data referred to by no means exhaust the entire complex of changes and disruptions occurring in the digestive system under the influence of long term hypokinesia. Despite their variety all these changes take a single direction: they reduce

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\* Numbers in the margin indicate pagination in the foreign text.

digestive activity and weaken the secretory and motor functions of the stomach and intestine with subsequent development of chronic endogenous intoxication which conditions the absorption of decomposition products of food materials.

In the context of what has just been outlined, in the alimentation of modern man one of our chief tasks is to set up conditions which prevent, or at the very least do not favor, occurrence of the negative effect of hypokinesia. Alimentation and hypokinesia should not act in the same direction. Alimentation should be sufficiently active, capable of toning up the digestive system and rousing it to activity.

Meanwhile the shifts in the alimentation of many persons not only do not hinder but actually favor the development and progress of those disturbances in the digestive system which come about as the result of general hypokinesia. If hypokinesia in general brings about a reduction in the activity of the digestive system, then it is equally true that the alimentation of many persons, their foodstuffs and food allowances taken as a whole likewise have reduced this activity.

It was not too long ago that food refining was spoken of as one of the most important of our contemporary problems. This is no longer true, inasmuch as bioactive noninterchangeable components, such as vitamins, polyunsaturated fatty acids, phosphates, lecithin, microelements, etc. are used in alimentation and preclude refining. In contemporary alimentation a new problem of great importance has arisen and the solution is fraught with difficulty. The food eaten by many persons today is losing to an ever increasing extent its capacity for toning the digestive system and its secretory and motor apparatus, actually diminishing the activity of alimentary toning and reducing the stimulus for other systems of the organism to be active.

Lowering of alimentary activity has occurred under the influence of many etiological factors among which we must mention before all others those of a technological nature, which weaken the activity of food products during the manufacturing process and possibly, in the case of vegetative products, during cultivation. Among the other causal factors we must include those qualities of alimentation that have taken shape in the diet of many persons under modern conditions.

In the manufacture of food products we note, among the factors that weaken their activity, a large number of different chemical, physical and temperature-related effects to which they are subjected at times. This refers to such highly active foodstuffs as vegetable oil, dairy butter, food extracts, bakery products, etc. The widespread use of the extraction method for making vegetable oil and its subsequent processing inevitably leads to weakening of its inherent natural activity. Even non-processed butter undergoes fairly intensive temperature-related and chemical treatment that affects its native activity. The addition of phosphates to processed vegetable oil does not completely restore the natural complex that defines its activity as a food product. An expensive product like real butter, made by the latest technological methods, is exposed during manufacture to a number of adverse factors associated with heating the cream, physical and mechanical influences that /20 go along with high speeds, etc. and are reflected in the structure of the butter fat. Due to their natural activity these unsurpassed foodstuffs are treated with every kind of consideration both in the manufacturing process in dairies as well as in prepared food establishments and in the home.

Another kind of staple food, bakery items, are deprived of some of their activity chiefly through removal of the germ when the flour is milled. If we wish to retain the activity of processed grain products we must find the most effective and the most technologically acceptable methods for enriching bakery products, including those of the highest quality, with germ in the form of special germ-enriched flour or some other germ product that may be introduced into the flour. This would achieve in the same degree as the introduction of phosphates into vegetable oil the effect of partial restoration of the natural activities of processed grain products.

It is also necessary to preserve the activity of a product for mass consumption such as milk. In respect to milk used as food the principle has long been established that the longer the interval between production and use the lower the activity. It seems that fresh milk, i. e. milk used as soon as possible, is the most active form of food milk. However, furnishing fresh milk to the whole population is out of the question, so we must look for methods of retaining the milk's activity as completely as possible so that in quality it will approach fresh milk.

A method for retaining high activity in milk is immediate refrigeration and transport in refrigeration units. Milk handled in this way retains its activity

fairly long, up to 24 hours and more, and in respect to biological qualities hardly differs from fresh milk. In the interest of people's health refrigeration conditions should be provided for on every dairy farm. Milk should be released only when it has been cooled to the set temperature. This temperature should be a standard index. Retention of the activity of this product is inseparably bound up with maintenance of high quality in the initial product; we must not permit acidity and bacterial proliferation to rise above threshold values. In respect to milk products, their activity may be enhanced by the addition of vitamins, by the economic use of skim milk and highly active buttermilk, etc. In all cases purposeful and correct use of lactic fermentation should be regarded as a factor in heightening the activity of diluted milk beverages such as reconstituted milk.

In order to provide for high activity in milk it is very important to reduce the trip from dairy farm to store, avoiding all intermediate steps. We should regard as very farsighted the setting up of equipment on dairy farms for pasteurization and bottling, thus making direct store delivery possible.

Measures taken to assure feed quality play an essential role in increasing the activity of milk. Milk gotten from cows fed on second rate feed has lost some of its activity at the very start and continues to do so as it is transported to the consumer.

In contemporary technological systems for the manufacture of many milk products and related products the milk is subjected to various factors that interfere with the natural composition of this marvelous food product. The composition of the milk is disturbed in the manufacture of milk products and creamery butter. Here an essential part of the milk appears unnecessary, superfluous and even an obstacle to obtaining the contemplated milk product. Thus in converting milk to butter there is /21 no place for the protein which goes into the whey and finds no use in human food consumption. Today, with new technological systems for turning out some milk products, a more and more "interfering" role seems to be played by lactose, milk sugar, that remarkable normalizer of intestinal digestion. A situation has been created in which, due to the release of lactose from milk products (in cheese making, etc.), so great a supply of lactose has been created that the question arises, what should be done with it and how it can be used most economically. A serious obstacle in the use of lactose for human food consumption and as food enrichment is some persons'

intolerance of milk. Here the negative effect of lactose appears associated with its negative effect on persons suffering from a congenital enzyme insufficiency in respect to lactose. This has led to an ever increasing lactose supply but its use is as restricted as ever.

Thus, the problem of using economically all the component parts of milk is very difficult and diverse, although in great part open to solution.

A very complicated problem is involved in preserving the activity of meat as a food product. We may suppose, that the most active form is fresh meat, i. e. meat that has spent little time between butchering and consumption. Under metropolitan conditions, of course, there is no question of supplying everyone with fresh meat in full quantity. However a great deal can be done to keep meat intended for mass consumption from lagging far behind fresh meat in the sales network as far as activity is concerned. In this context the first problem to call for attention is refrigeration. It may be supposed, that modern refrigeration methods insure a high quality level in preserving the nutritional and biological properties of refrigerated meat. Moreover, a fairly long refrigeration period does not entail the meat's loss of activity as food.

All the problems, i. e. the loss of activity by refrigerated meat, occur in processing and following defrosting. If it were possible to avoid, i. e. exclude the thawing process, there would be a possibility of having meat with hardly any loss of activity and very close to fresh meat. In this context special interest is created by chilled meat, i. e. meat chilled to the limit but not frozen. This is usually done by bringing the inner temperature of the meat down to  $+4^{\circ}\text{C}$ .

There is promise in the sublimation method for dehydrating some foods which assures preservation of their activity in the highest degree and long-term stability in storage. Sublimational dehydration, lyophilization, deals with the frozen product in a vacuum, where the water is removed directly from the ice crystals without going through the fatty stage. Heating the frozen product in a vacuum prevents it from thawing, thus guaranteeing complete activity of the product, including the retention of vitamins, salts, the flavor complex, etc.

The outstanding feature of sublimated products is the fact, that on hydration,

i. e. when water is added, the foods recover most of their natural properties as found in the fresh product. If it is proposed that astronauts be fed sublimated foods in long orbital space flights, there is every justification to extend the use of such products to people on earth.

The weightiest factor in reducing food activity, as is well known, is the refining, i. e. the "purifying" of the product, removing fillers and impurities and guaranteeing its maximum homogeneity.

Instant products (coffee, sugar, tea, etc.) which have become so widespread /22 may be regarded as a new form of refined food products.

A real threat to the activity of foods is posed by the unfounded exclusion from people's diet of whole groups of highly active foods (eggs, butter, cream, cabbage, vegetables, etc.). If we stop to realize, that every food product has its own unique properties not duplicated in other products, we can understand what care must be exercised in recommending or discouraging the use of a given food.

Under current conditions of alimentary hypokinesia for persons, including the mature and the elderly, who practically speaking are healthy, of prime importance is the collective factor, which envisions exclusion of mass consumption of food while retaining a high degree of food variety.

Realization of suitable measures for preserving food activity may be one of the effective ways to forestall development of the consequences of prolonged general hypokinesia.